Expert Report of
Richard J. Lee, Ph.D.

For Asbestos Property Damage Claims
Product Identification

Project Number: LSH506355

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Executive Summary

RJ Lee Group, Inc. (RJLG) was asked by W. R. Grace & Co. (Grace) to review and compile laboratory data for bulk samples that were submitted with asbestos property damage claims, compare the bulk sample results with Grace formulas for asbestos-containing surfacing products and, to the extent permitted by the data, make a determination as to whether the results are inconsistent or not inconsistent with those formulas.

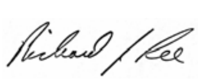
Grace's product formulas are like recipes—they specify the ingredients (i.e., constituents) and the amount (i.e., abundance) of each ingredient to be used in the products. Thus, the products can be tested using conventional laboratory methods and compared to the formulas used at the time of manufacture.

RJLG has extensive experience in performing constituent analysis of building materials. Constituent analysis is the process of evaluating a material through the use of appropriate analytical techniques to identify and quantity the constituent parts of the material. Over the past 20 plus years, RJLG has performed constituent analysis of a wide range of bulk material samples.

From the 445 claims that submitted bulk sample analytical data, RJLG compiled and evaluated laboratory results from nearly 15,000 bulk material samples and compared those results to Grace's formulas. Fifty-one percent (51%) of the results demonstrated that the samples were not a Grace surfacing product; 35% of the results provided insufficient information on which one could base a conclusion; and 10% were samples for which the results did not match Grace's formulas. Only 4% of the results indicated the sample was possibly a Grace surfacing product.

Of the 445 claims, the laboratory data for 143 claims fail to demonstrate the presence of any Grace asbestos-containing surfacing product in the buildings at issue in those claims.

I hold the opinions in this report to a reasonable degree of scientific certainty. In addition to the opinions set forth in this report, I may also rely on or comment on the publications, opinions, data and materials produced in discovery or contained in reports of other experts designated by the claimants or Grace in this action, and I reserve the right to amend or supplement this report as necessary.



Richard J. Lee, Ph.D.
President
RJ Lee Group, Inc.

1.0 Qualifications

Dr. Richard J. Lee obtained a Bachelor of Science degree in physics from the University of North Dakota in 1966 and a Ph.D. in theoretical solid state physics from Colorado State University in 1970. He then went to Purdue University as an Assistant Professor in physics where he taught courses on the principles of optical microscopy. He received tenure at Purdue in less than two years.

In 1973, Dr. Lee went to work for United States Steel, first as a research scientist and thereafter, as director of their physics and electron microscopy department in the Technical Center. He remained at the United States Steel Research Center until 1985. While at United States Steel, he analyzed a wide range of materials and was employed by NASA to analyze moon rocks brought back by the Apollo missions.

During his tenure at USS Research, Dr. Lee was responsible for developing the first techniques for quantitatively identifying amphibole asbestos fibers and cleavage fragments by a combination of transmission electron microscopy and energy dispersive X-ray analysis. He participated in the original ASTM committee that developed and evaluated the first TEM methods for preparing samples of air, bulk and water for the determination of asbestos content. Dr. Lee was the first scientist to develop methods for distinguishing asbestos amphiboles from cleavage fragments using transmission and scanning electron microscopy.

Since 1985, Dr. Lee has been President of a company now known as RJ Lee Group, Inc., (RJLG) which has its principal office in Monroeville, Pennsylvania, and laboratories in San Leandro, California; and Manassas, Virginia. RJLG provides research, analytical and consulting services relating to materials characterization. Materials characterization of bulk building materials, also referred to as "constituent analysis", involves analyzing a sample of material using various techniques to identify and quantify the components of that material.

Dr. Lee has a long history of scientific consulting and service for government agencies, including the EPA. RJLG's laboratory serves as a quality assurance and referee laboratory on a number of EPA programs. RJLG's laboratory performed the analyses for the EPA's major study on airborne levels of asbestos in public buildings. Dr. Lee has participated in the development by the EPA of analytical methods and procedures for asbestos analyses. The EPA requested that he personally participate in several projects, including the drafting of the portions of the EPA AHERA regulations governing air sample analysis after abatement.

RJLG also performs analyses for the United States Navy, the United States Army and the United States General Services Administration. Dr. Lee developed a program to determine the cause of failure in components of the guidance system in the Trident missile for the Department of the Navy.

RJLG's laboratory has also performed microscopic analyses for the State of California Air Resources Board when that agency performed testing of the air in major cities in the State of California to determine the presence of asbestos.

Dr. Lee is now engaged in and specializes in materials characterization, which is the science that uses a variety of analytical techniques to determine the identity and amount of each component of a material. He has performed materials characterization analyses on many samples of vermiculite produced from different sources for over 15 years. He is familiar with all methods of microscopy that are commonly used in characterizing asbestos or identifying and quantifying asbestos, including optical microscopy, scanning electron microscopy and transmission electron microscopy. He is also familiar with all known methodologies, from air sampling to dust sampling, with respect to asbestos. He has worked extensively with, and is an expert in, analytical techniques, including light and electron microscopy, materials characterization, asbestos air, bulk, and dust samples, and methods of evaluation. He has also served as an expert witness in litigation involving asbestos in buildings and ZAI and has testified in state and federal courts.

Dr. Lee is familiar with airborne levels of asbestos fibers both in buildings and in outdoor air, the sources of asbestos in the outside or ambient air, scientific knowledge and techniques regarding the measurement of levels of asbestos in the air, the development and use of the technology to measure both airborne levels of fibers and levels in materials samples, and the standards and methods used for air sampling. He has been involved in analyzing and producing bodies of air sampling data for EPA and other governmental and private entities including analysis of samples taken in an ongoing nationwide study of airborne levels in buildings and his analysis of air samples taken in an EPA-sponsored study in Texas.

He is also familiar with the history of standards governing asbestos including the current standards, regulatory positions and philosophies, different types of asbestos fibers, asbestos fiber levels as reported in the literature, as well as his own work concerning buildings with asbestos-containing materials.

A copy of Dr. Lee's curriculum vitae and publications list, as well as a list of his testimony for the past four years are attachments 1 and 2 hereto.

2.0 Analyses of Bulk Building Materials

In the mid to late 1970's building owners and schools could obtain the analysis of building materials to determine whether they contained asbestos. Such analyses were generally available throughout the country and were performed by PLM and frequently supplemented by dispersion staining.

In the 1979 US EPA document "Asbestos-Containing Materials in School Buildings: A Guidance Document"[1], EPA advised interested parties to request bulk sample analyses by "Polarized Light Microscopy (PLM) and X-ray Diffraction (XRD) as necessary to supplement the PLM method".

Over the past twenty years RJLG has analyzed thousands of bulk building material samples by employing various analytical techniques to determine the identity and relative abundances of their constituent components. RJLG has provided expert testimony concerning the results of its analyses in numerous litigations.

Depending on the analytical objectives and nature of the samples, one or more of the following analytical techniques are employed when performing a constituent analysis of bulk building material samples.

2.1 Optical inspection of the sample using Stereo Optical and Polarized Light Microscopy (PLM)

The stereo optical microscope permits evaluation of the color and texture of samples in ordinary light at magnifications ranging from 5x to 40x. Using this technique it is possible to identify and separate layered samples, evaluate the homogeneity of samples and identify and estimate the abundance of coarse materials such as aggregate. This technique is widely used in materials analysis and in quality control inspections as well as for the analysis of samples of bulk building materials.

The polarizing light microscope is used in the examination of virtually all bulk samples. This technique has been used for many years in geology, mineralogy and forensic analysis to identify minerals, organic compounds and biological materials. It is the principal method used by laboratories for identifying and quantifying the presence of asbestos in samples of building material products. The polarizing light microscope allows examination of finely divided samples of building materials at magnifications varying from 50x to 400x. The technique is based on the effects materials have on light. In the PLM technique, light passes through and interacts with the sample, providing information about the mineral's crystal properties, internal structure, formation and composition. Samples are prepared by pulverizing the finely divided material and dispersing it on a glass slide in oil with a known index of refraction. The amount of each substance present in the sample is visually determined by estimating the percentage of the area on the microscope slide occupied by that component.

2.2 Bulk Weight Loss

A portion of the sample is treated with hydrochloric acid (HCl) to determine the weight percentage of the sample that is soluble. The components of building material that are soluble are generally carbonates (e.g., calcite) or sulfate (e.g., gypsum).

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[1] Asbestos-Containing Materials in School Buildings: A Guidance Document, Part 1, US EPA, Office of Toxic Substances, C00090, March 1979.

2.3 Scanning Electron Microscopy (SEM)

The SEM is based on the same principles as the optical microscope but it makes use of electrons rather than light as a means of probing the sample. It is also capable of much higher magnifications than the optical microscope and therefore permits the material to be studied on the nanometer (nm) to micrometer (μm) scale. In the examination of bulk building material samples the material is ground to a fine powder and placed in the SEM for examination. A beam of finely focused electrons is passed through a series of magnetic lenses (compared to the glass lens used to produce magnified images in the optical microscope) and onto the sample. When the electrons hit the sample they interact with the material to produce a variety of signals including secondary electrons, backscattered electrons, characteristic x-rays, and photons.

A SEM image is constructed by scanning the finely focused probe in a regular pattern across the sample surface. As the beam is scanned, the secondary and backscattered electrons are collected and used to modulate the intensity of a cathode ray tube in the same manner as a television set. The SEM image is an intensity map and provides a three-dimensional-like image of the surface of the sample.

In addition to the generated electrons that are used to create a SEM image, characteristic x-rays are also produced when the electron beam interacts with the sample. The electron beam can be placed in a static position to obtain an analysis at one point. The unique x-rays that are generated have energies specific to the elements in the sample. The x-ray spectrum that is formed constitutes a chemical or elemental fingerprint of the sample. Knowledge of the elements present in the sample combined with the three dimensional information from the SEM image provides information for the characterization and identification of a variety of materials.

2.4 X-Ray Diffraction (XRD)

X-ray diffraction is a well-known method for determining the identity and abundance of crystalline components in solid materials. The constituents of bulk building materials are comprised of natural materials that are mined and processed to produce the building material product. Many of these are crystalline in nature and are known as minerals. XRD provides a powerful and reliable method for determining the identity and amount of crystalline constituents in a sample.

Crystalline materials are comprised of a three-dimensional regular array of atoms. The distance between the planes of atoms in this array is on the same order as the wavelength of X-rays. An X-ray beam can therefore be diffracted from these planes of atoms much like visible light is diffracted by a thin grating. This distance, known as the d-spacing, is a fundamental property of a crystalline material. The d-spacing is calculated by a mathematical formula known as Bragg's Law, which is a function of the angle between the incident and diffracted X-ray beam, known as 2-theta, and the wavelength of the X-rays used in the measurement. A crystalline material is identified by matching a series of these d-spacings to a database of known crystalline structures.

The intensity of the X-rays that are diffracted by a compound is proportional to the quantity of that material in the sample. The intensities can be calibrated by relating them to a known amount material added to the sample. This technique, know as the internal standard method, is discussed in Chung[2].

2.5 Atomic Absorption (AA)

In flame atomic absorption a sample solution is aspirated into the flame where the fine droplets are dried, volatilized and disassociated into ground-state atoms. A beam of light from a single-element hollow cathode lamp, emitting wavelengths characteristic of that element, is passed through the flame containing the atomized sample. The ground state atoms in the flame absorb the light from the hollow cathode lamp decreasing the intensity of the lamp's beam. The amount of light absorbed is a function of the concentration of that specific element in the sample.

2.6 Ion Chromatography (IC)

The retention of ions on an exchange column can be used to separate individual ionic species much the same way that the gas chromatograph separates gaseous phases. The retention times can be used to determine the identity of the species and the increase in conductivity as the detector can be calibrated with suitable standards to determine quantity. Using ion chromatography, analysis of anions such as chloride, fluoride, bromide, nitrate, sulfate and phosphate can be performed.

2.7 Multiple Analysis Approach

Typically RJLG employs a multiple analysis approach for analyzing bulk building material samples. This approach is used because the samples are comprised of constituents having certain physical, chemical (elemental) and textural characteristics or "fingerprints". Because some constituents are more readily identified and quantified by certain analytical techniques than others, and because some tests may not be able by themselves to distinguish or quantify certain constituents definitively, no one test can be used exclusively for determining the constituents and their relative abundances in a sample. Generally, the same analytical techniques are used for identifying and quantifying constituents. However, certain methods provide better estimates of the abundance of a constituent than others. RJLG's multiple analysis approach is used to confirm preliminary findings and brings precision and accuracy to the analyses.

After performing the multiple analyses of a sample, all results are considered, evaluated and relied upon to form an opinion about the constituents present and their relative abundances.

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[2] Chung, F. H. (1974a) "Quantitative Interpretation of X-ray Diffraction Patterns of Mixtures. I. Matrix-Flushing Method for Quantitative Multicomponent Analysis." J. Appl. Cryst. v7, 519-525 (Theory).

3.0 Grace Formulas for Asbestos-Containing Building Materials

Over the years, RJLG has compared and contrasted the results of its numerous analyses of bulk building materials with product formula at issue. Additionally, RJLG has also compared the results of analyses performed by other laboratories to Grace's product formulas.

In determining whether sample results are inconsistent or not inconsistent with particular product formulas, RJLG evaluates whether the constituents named in the product formulas are present or absent, whether constituents not called for in the product formulas are present and how estimated abundances of the constituents in the sample compare with the abundances specified in the product formulas.

RJLG has reviewed and is familiar with product formulas for Grace's spray-on asbestos-containing building products.

Generally these products fall into two categories: fireproofing and acoustical plasters. Grace's asbestos-containing fireproofing generally consisted of gypsum, vermiculite and chrysotile asbestos. Grace's formulas for acoustical plaster varied to some degree but generally the constituents included vermiculite, clay, chrysotile and sometimes titania. A copy of the Grace formulas for asbestos-containing surfacing materials is included in Appendix A.

Comparing bulk material sample results to product formulas is similar to comparing a list of ingredients to a recipe. A sample is determined to be inconsistent with the formulas if:

- *Constituents are present that are not called for in the formulas*. For example, the formulas call only for gypsum, vermiculite and chrysotile asbestos but mineral wool or amosite asbestos is present in the sample;
- *Constituents are absent that are called for in the formulas*. For example, the formulas call for gypsum, vermiculite and chrysotile asbestos but no vermiculite is present;
- *Constituents are identified in disproportionate amounts.* For example, the formula calls for chrysotile asbestos to be present at 5-10 percent but the results indicate that chrysotile asbestos is present at 80-90 percent.

In reviewing the results of analyses performed by other laboratories, RJLG has found that they do not always provide sufficient data to enable one to compare the results to a product formula. For example, some laboratories issue laboratory reports for a bulk building material sample by identifying and quantifying only the asbestos component of the sample. With such limited information (i.e., the identity and quantity of only one constituent) one cannot determine to a reasonable degree of scientific certainty whether or not the material is consistent with a specific product formula. Another example is that some laboratories identify and quantify the asbestos component of the sample and report all other components under a category heading such as "binder" or "non-fibrous material". Again, with such limited and nonspecific information about the components of

the sample, one cannot determine to a reasonable degree of scientific certainty whether or not the material is consistent with a specific product formula.

4.0 Claims Documents Reviewed

RJLG was provided with documents filed by claimants in this matter to which building inspection and laboratory data were attached. Bulk sample analytical data was provided for 445 claims. RJLG reviewed the documents provided and compiled all laboratory results of bulk building materials. The compilation included such information as claim number, address, city, state, building type, building description (e.g., elementary school, government, college dormitory), claimed product (e.g., Monokote 3, Zonolite Acoustical Plaster, acoustical products, ceiling tile, flooring, texture finish, surface treatment), sample description (e.g., spray-on material, acoustical material, debris, dust, white fibrous material, fireproofing, ceiling spray, fibrous material, sheetrock), gross visual description (e.g., gray fibrous, white/tan granular, white chalky, white fluffy), identification of components observed (e.g., chrysotile, amosite, perlite, vermiculite, calcite, cellulose, mineral wool, binder), and the abundance (i.e., percent) of each identified component. Data for 14,707 asbestos-containing samples from 445 claims were compiled and reviewed. The sample by sample data compilation is included on a CD submitted with this report.

The data have been summarized in Appendix B which provides for each claim, the claim number and the number of samples that: (1) report the presence of asbestos; (2) reports data for samples that are not Grace products; (3) have insufficient data to determine whether the sample is inconsistent or not inconsistent with Grace's product formulas; (4) have data for samples that are inconsistent with Grace's product formulas; and (5) have data for samples that are not inconsistent with Grace's product formulas.

4.1 Samples with Laboratory Data Demonstrating Not a Grace Product

Of the results reviewed, 7,504 samples were not surfacing materials manufactured by Grace. These samples included pipe insulation, mud, tape, ceiling tile, floor tile, glaze and mastic. A list of the claims reviewed and the number of ACM samples that are not a Grace product is provided in Appendix B.

4.2 Samples with Insufficient Laboratory Data

Laboratory data were insufficient to render a conclusion as to whether the material was inconsistent or not inconsistent with Grace's formulas for 5,147 samples. Some of the laboratory results indicated the amount of chrysotile asbestos that was present in the samples but did not identify any of the other constituents of the material. Other laboratory results indicated the amount of chrysotile asbestos that was present and identified the remaining portion of the material simply as "binder" or "non-fibrous material" without identifying the specific components that make up the binding material. A list of the claims reviewed and the number of ACM samples where there were insufficient laboratory data to draw a conclusion is provided in Appendix B.

4.3 Samples with Laboratory Data Inconsistent with Grace Products

Laboratory data from 1,418 samples demonstrated that the surfacing ACM that was sampled is inconsistent with the Grace formulas. The laboratory results indicated the presence of a component not called for in the Grace formulas (e.g., non-chrysotile asbestos, cellulose, glass fiber, mineral wool, foam) or the absence of a component called for in the Grace formulas. A list of the claims reviewed and the number of ACM samples that are inconsistent with Grace's formulas is provided in Appendix B.

4.4 Samples with Laboratory Data Not Inconsistent with Grace Products

Laboratory results showed that 638 samples are possibly Grace's product (i.e., not inconsistent with Grace's formulas for asbestos-containing surfacing products). A list of claims reviewed identifying the claims and the number of ACM samples that are not inconsistent with Grace's formulas is provided in Appendix B.

4.5 Claims with Laboratory Data that Fail to Establish the Presence of a Grace Product

RJLG reviewed laboratory data from 445 claims. There were 143 claims (with 4,221 samples) where the laboratory data did not establish the presence of a Grace asbestos-containing surfacing product in the buildings at issue in those claims. A list of the 143 claims is shown in Table 1 below.

Table 1. List of Claims with Laboratory Data that Fail to Establish the Presence of a Grace Product

2636	6966	8370	10643	11620	12315	12430	12528
2763	7028	8371	10644	11664	12316	12431	12530
2785	7092	8372	10645	11678	12317	12432	12531
2977	8027	8373	10646	11680	12322	12433	12533
3406	8028	8374	10647	11681	12329	12440	12534
3515	8029	8375	10650	11682	12331	12443	12536
4382	8030	9684	10651	11683	12346	12476	12542
5651	8035	10631	10652	11684	12348	12489	12654
6941	8357	10632	10653	12293	12368	12490	12672
6957	8358	10633	10655	12303	12395	12491	12673
6958	8359	10634	10656	12304	12396	12493	12681
6959	8361	10635	10657	12305	12397	12498	12682
6960	8362	10636	10658	12307	12405	12500	12683
6961	8363	10637	10659	12308	12421	12501	12720
6962	8364	10638	10662	12310	12422	12503	12752
6963	8365	10640	11322	12311	12423	12522	12780
6964	8368	10641	11323	12312	12424	12526	13950
6965	8369	10642	11618	12313	12427	12527	

5.0 Appendix A

Grace Product Formulas

FORMULAE FOR ASBESTOS-CONTAINING FIREPROOFING, ACOUSTICAL PLASTER AND SURFACE TEXTURE PRODUCTS MANUFACTURED BY GRACE AND/OR ZONOLITE

The following are formulae for W.R. Grace & Co.-Conn. and Zonolite Company asbestos-containing acoustical plaster, surface texture and fireproofing products.

Zonolite Acoustical Plastic (Standard) (a/k/a Vermiculite Acoustical Plastic/Plaster)

Vermiculite (60-70%)
Bentonite (montmorillonite type)(15-19%)
Asbestos (15-19%)
Sodium Lauryl Sulfate (<1%)

Zonolite Acoustical Plastic (Bermuda Tan) (a/k/a Vermiculite Acoustical Plastic/Plaster)

Vermiculite (56-64%)
Bentonite (montmorillonite type)(16-20%)
Asbestos (16-20%)
Sodium Lauryl Sulfate (<1%)
Dowicide (<1%)
Sodium Nitrate (<1%)

Board of Education Hard Texture

Perlite (40-48%)
Bentonite (montmorillonite type)(23-27%)
Titanium Dioxide (13-15%)
Asbestos (9-12%)
North Carolina Clay (2-4%)
ZOD Concentrate (2-3%)
Calcium Carbonate (1-2%)
Sodium Lauryl Sulfate (<1%)
Fungicide (<.5%)

Board of Education Texture

Perlite (41-49%)
Bentonite (montmorillonite type)(23-27%)
Titanium Dioxide (13-15%)
Asbestos (9-12%)
North Carolina Clay (2-3%)
Calcium Carbonate (1-2%)
Sodium Lauryl Sulfate (<1%)
Fungicide (<.5%)

Ari-Zonolite Board Texture

This product was manufactured by the Ari-Zonolite Company for a two or three year period in the early 1960's. Grace believes the product contained approximately 10% commercial asbestos, but has no formula documents. The investigation is continuing.

Econo-White 65 and Econo-White 70
(a/k/a Econo-White Acoustical
Texture and Econo-White Super White)

Perlite (60-70%)
Bentonite (montmorillonite type)(13-17%)
Asbestos (13-17%)
Titanium Dioxide (2-8%)
Sodium Lauryl Sulfate(<1%)

Zonolite Finish Coat (Decorator's White)
(a/k/a Zonolite Acoustical Finish)

Vermiculite (63-72%)
Bentonite (montmorillonite type) (11-15%)
Asbestos (11-14%)
Titanium Dioxide (5-7%)
Sodium Lauryl Sulfate (<.5%)

Zonolite Finish Coat (Decorator's White) (Extra Hard)

Vermiculite (61-69%)
Bentonite (montmorillonite type) (12-14%)
Asbestos (11-14%)
Titanium Dioxide (5-7%)
Sodium Lauryl Sulfate (2-3%)

Hi Sorb Acoustical Plaster
XX White HiSorb

South African Vermiculite (20-32%)
Perlite (4-13%)
Plaster of Paris (50-60%)
Asbestos (8-10%)
Bentonite (1.5-2.5%)
Cal. Concentrate (2.3%)
Titanium (1.5-2.5%)
Drywall Additive (<3%)

Oyster White HiSorb

South African Vermiculite (18-27%)
Vermiculite (10-13%)

Plaster of Paris (50-60%)
Asbestos (8-10%)
Bentonite (1.5-2.5%)
Cal. Concentrate (1.8-2.5%)
Drywall Additive (<3%)

Hi Temp Insulating Cement
(a/k/a Zonolite High Temperature Cement,
Zonolite Hi-Temperature Cement,
Zonolite High Temperature Insulating Cement)

Vermiculite (60-70%)
Bentonite (montmorillonite Type) (15-19%)
Asbestos (15-19%)
Orvus Neutral Granule (<1%)

Zonolite Mono-Kote (MK-1)

Vermiculite (40-45%)
Plaster of Paris (33-37%)
Asbestos (10-13%)
Portland Cement (7-9%)
ZOD Concentrate (1-2%)

Spra-Insulation (MK-2)

Vermiculite (41-46%)
Plaster of Paris (33-37%)
Asbestos (10-13%)
White Portland Cement (6-9%)
ZOD Concentrate (1-2%)

Zonolite Mono-Kote MK-3

Plaster of Paris (55-59%)
Vermiculite (28-32%)
Asbestos (10-14%)
Sodium Lauryl Sulfate (<1%)

Perltex Super-40 Fog
(a/k/a Perltex Fog)

Whiting (75-86%)
Talc (6-8%)
Asbestos (4-7%)
Staramic (3-5%)
Titanium Dioxide (1-2%)
Dowicil (<1%)
Methocel (<1%)
NTA (<1%)
Daxad-17 (<1%)

Ultramarine Blue (<.5%)

In two formula documents, one undated and one dated March 14, 1972, talc, titanium dioxide, Daxad 17 and ultramarine blue were eliminated from the above formula and replaced with lithopone (6-9%), casein (1-2%), TSP (<1%) and sodium nitrite (<.5%).

Perltex Spray Surfacer
(a/k/a PlasterTex, Perltex Super-40
Spray Surfacer, and Perltex Super-40)
and Gun Coat Spray Surfacer)

Whiting (11-40%)
Sodium Nitrate (<1%)
Lithopone (5-25%)
Casein (2.5-11%)
Mica XX (7-10%)
Pryprophyllite (3-8%)
Soya Flour (0.5-4%)
Asbestos (6-13%)
Kalloid Clay (5-12%)
Tri Sodium Phosphate (0.5-4%)
KA 47 Titanium (0.5-4%)
Mica AA (7-16%)
Snow Flake Lime (<1%)
Dowicide G (<1%)
Calcium Sterate (<1%)
Perlite (4-18%)

Perltex Super-40 Perlite
(a/k/a Perltex Perlite and Super-40 Perlite)

Whiting (65-75%)
Perlite Aggregate (7-11%)
Asbestos (6-8%)
Lithopone (5-9%)
Staramic (4-6%)
Casein (1-2%)
Methocel (<1%)
Trisodium Phosphate (<1%)
Dowicil (<.5%)
Sodium Nitrite (<.5%)
NTA (<.5%)

Perltex Super-40 Polycoarse
(a/k/a Perltex Polycoarse,
Perltex Super-40 Poly and Perltex Poly)

Whiting (64-74%)
Talc (14-16%)

Asbestos (4-6%)
Staramic (4-5%)
Lithopone (3-4%)
Methocel (1-2%)
Polystyrene Aggregate (1-2%)
NTA (<1%)
Dowicil (<.5%)
Daxad-17 (<.5%)
Ultramarine Blue (<.5%)

Two formula documents, one undated and one dated March 14, 1972, set forth the following formula for Super 40 Poly:

Whiting (38-42%)
Talc (38-42%)
Asbestos (1-2%)
Lithopone (11-15%)
Methocel (<1%)
Poly Beads (1-3%)
NTA (<1%)
Dowicil (<1%)
Casein (1-2%)
TSP (<1%)
Kalloid Clay (1-2%)
Natrosol (<1%)

<u>Perltex Super-40 SAV</u>

Whiting (67-77%)
SAV Aggragate (6-8%)
Lithopone (6-8%)
Asbestos (5-7%)
Staramic (4-6%)
Casein (1-2%)
Trisodium Phosphate (<1%)
Methocel (<1%)
NTA (<1%)
Sodium Nitrite (<.5%)
Dowicil (<.5%)

<u>Zonolite Spra-Tex (Regular)</u>

Kaolin Clay (31-35%)
Asbestos (30-36%)
Titanium Dioxide (15-17%)
Vermiculite (14-19%)
Sodium Lauryl Sulfate (<1%)

<u>Zonolite Spra-Tex EH (Extra Hard)</u>

Kaolin Clay (30-34%)
ASbestos (29-35%)
Vermiculite (14-19%)
Titanium Dioxide (15-17%)
ZOD Concentrate (2-4%)
Sodium Lauryl Sulfate (<1%)

Spra-Wyt
(a/k/a Spra-Wyt Finish, Spra-Whyt
<u>Acoustical, and Spra-Wyt Acoustical Finish)</u>

Perlite (50-60%)
Bentonite (montmorillonite type) (16-20%)
Asbestos (16-20%)
Titanox RA-50 (4-5%)
Double Hydrate Lime (4-5%)
Duponol WA Dry (<.5%)
Dowicide "6" (<.5%)

<u>Versakote (Prep Coat #4)</u>

White Portland Cement (38-42%)
Whiting (26-30%)
Hydrated Lime (11-13%)
Perlite Aggregate (6-10%)
Asbestos (5-7%)
Titanium Dioxide (2-3%)
Aluminum Hydrate (1-3%)
Aluminum Stearate (<1%)
Gelvatol (<1%)
Hamaco (<1%)
Daxad-17 (<1%)
Darex Set Accel. (<1%)
Nopco PD-1 (<1%)
Dowicil (<.5%)

Z-Tex
<u>(a/k/a EZ-Tex)</u>

Plaster of Paris (40-50%)
Vermiculite (24-28%)
Asbestos (13-17%)
White Cement (11-13%)
ZOD Concentrate (<.5%)
Retarder (<.5%)
Dowicide (<.5%)

<u>Zono-Coustic 1</u>

Vermiculite (75-85%)
Asbestos (11-14%)

Plaster of Paris (5-8%)

<u>Zono-Coustic 2</u>

Vermiculite (41-46%)
Plaster of Paris (33-37%)
Asbestos (10-13%)
White Portland Cement (6-9%)
ZOD Concentrate (1-2%)

<u>Zono-Coustic 3</u>

Plaster of Paris (35-39%)
Vermiculite (34-38%)
Asbestos (11-14%)
Hydrated Lime (8-11%)
Titanium Dioxide (3-4%)
Sodium Lauryl Sulfate (<1%)

<u>Zono-Coustic Z</u>

Vermiculite (38-42%)
Plaster of Paris (34-38%)
Asbestos (11-14%)
Portland Cement (7-9%)
Sodium Lauryl Sulfate (<1%)

<u>Perlcoustic</u>

Perlite (53-61%)
7 M Asbestos (15-17%)
Solka-Floc BW-20 (4.5-5.5%)
Bentonite (19-21%)
Sodium Nitrite (<1%)
Dowicide G (<1%)
Naconal DB Beads (<1%)

<u>Perltex Prep Coat #3</u>

White Cement (40-44%)
Asbestos (4-5%)
Calcium Carbonate (18-20%)
Vermiculite (10.5-11.5%)
Finish Lime Double
Hydrated (10.5-11.5%)
Perlite (10.5-11.5%)

<u>Prep Coat #5 (Puerto Rico)</u>

White Portland Cement (38-42%)

Whiting (14-19%)
Hydrated Lime (11-13%)
Asbestos (5-7%)
Vermiculite (18-22%)
Perlite Aggregate (7-11%)

<u>Satin White</u>

Vermiculite (46-53%)
Bentonite (6-9%)
Asbestos (13-17%)
Whiting (20-24%)
Titanium Dioxide (1-2%)
Satin White Concentrate (2-5%)
MBS 40 (<.5%)

<u>Ari-Zonolite Natural</u>

Vermiculite (55-60%)
Asbestos (15-19%)
Bentonite (15-19%)
Duponol (<.5%)
Sodium Nitrate (<1%)
Plaster of Paris (6-9%)

<u>Ari-Zonolite Oyster White</u>

Vermiculite (38-42%)
Asbestos (28-32%)
Bentonite (10-14%)
Duponol (<1%)
Titanium (4-8%)
Perlite (10-13%)

<u>Ari-Zonolite Nu-White</u>

Asbestos (41-46%)
Bentonite (9-13%)
Plaster of Paris (4-7%)
Perlite (36-41%)
Duponol (<1%)
Elvalol (<1%)

<u>Zonolite Finishing Cement</u>

Asbestos (21-26%)
Bentonite (3-5%)
Plaster of Paris (42-50%)
Vermiculite (22-27%)
Gypsum Retarder (<.5%)

Whiting (14-19%)
Hydrated Lime (11-13%)
Asbestos (5-7%)
Vermiculite (18-22%)
Perlite Aggregate (7-11%)

<u>Satin White</u>

Vermiculite (46-53%)
Bentonite (6-9%)
Asbestos (13-17%)
Whiting (20-24%)
Titanium Dioxide (1-2%)
Satin White Concentrate (2-5%)
MBS 40 (<.5%)

<u>Ari-Zonolite Natural</u>

Vermiculite (55-60%)
Asbestos (15-19%)
Bentonite (15-19%)
Duponol (<.5%)
Sodium Nitrate (<1%)
Plaster of Paris (6-9%)

<u>Ari-Zonolite Oyster White</u>

Vermiculite (38-42%)
Asbestos (28-32%)
Bentonite (10-14%)
Duponol (<1%)
Titanium (4-8%)
Perlite (10-13%)

<u>Ari-Zonolite Nu-White</u>

Asbestos (41-46%)
Bentonite (9-13%)
Plaster of Paris (4-7%)
Perlite (36-41%)
Duponol (<1%)
Elvalol (<1%)

<u>Zonolite Finishing Cement</u>

Asbestos (21-26%)
Bentonite (3-5%)
Plaster of Paris (42-50%)
Vermiculite (22-27%)
Gypsum Retarder (<.5%)

6.0 Appendix B

Claim Number	Number of Samples: Total with Asbestos	Not a Grace product	Insufficient Data	Wrong Components	Not Inconsistent with Grace Formula
2636	3	3	-	-	-
2763	1	-	-	1	-
2785	1	-	1	-	-
2977	7	4	3	-	-
3405	16	10	2	3	1
3406	2	-	2	-	-
3515	14	12	2	-	-
4382	1	-	-	1	-
5586	3	2	-	-	1
5587	2	-	-	1	1
5588	9	5	3	-	1
5589	62	-	26	35	1
5590	7	2	4	-	1
5591	39	27	9	2	1
5644	21	11	9	-	1
5645	17	15	1	-	1
5646	2	-	-	-	2
5647	1	-	-	-	1
5648	8	1	4	1	2
5650	31	13	13	-	5
5651	11	8	3	-	-
5652	1	-	-	-	1
5653	1	-	-	-	1
5654	115	81	10	20	4
5655	306	256	43	1	6
5656	2	-	-	-	2
5657	213	201	8	1	3
5658	62	22	34	4	2
5659	9	7	1	-	1
5660	6	-	4	-	2
5661	48	42	3	1	2
5662	70	53	1	15	1
5663	21	15	5	-	1
5664	110	95	11	3	1
5665	51	7	40	1	3

Claim Number	Number of Samples: Total with Asbestos	Not a Grace product	Insufficient Data	Wrong Components	Not Inconsistent with Grace Formula
5666	113	105	6	1	1
5667	92	89	2	-	1
5668	103	99	-	3	1
5669	53	40	8	3	2
5670	16	9	6	-	1
5671	26	16	9	-	1
5672	149	48	94	2	5
5673	107	95	8	3	1
5674	53	26	17	8	2
5675	86	63	10	12	1
5676	170	72	90	5	3
5677	189	88	85	11	5
5678	49	21	21	6	1
5679	30	17	-	12	1
5680	45	39	5	-	1
5681	29	14	14	-	1
5682	19	15	3	-	1
5683	1	-	-	-	1
5684	1	-	-	-	1
5685	223	124	77	20	2
5686	101	73	13	14	1
5687	68	42	19	6	1
5688	44	38	5	-	1
5690	11	1	4	1	5
6065	111	86	13	7	5
6066	9	1	6	-	2
6067	64	35	21	3	5
6068	17	15	1	-	1
6069	63	55	3	4	1
6070	95	76	17	1	1
6071	100	82	16	1	1
6072	70	56	13	-	1
6073	87	67	13	5	2
6074	17	5	8	-	4
6102	4	3	-	-	1

Claim Number	Total with Asbestos	Not a Grace product	Insufficient Data	Wrong Components	Not Inconsistent with Grace Formula
	Number of Samples				
6933	1	-	-	-	1
6937	11	8	1	-	2
6938	14	9	3	-	2
6939	5	-	3	-	2
6940	6	1	3	1	1
6941	5	-	3	2	-
6942	10	1	4	3	2
6943	37	2	21	13	1
6944	4	-	1	2	1
6945	124	16	98	-	10
6946	94	29	19	1	45
6947	23	3	8	-	12
6948	131	16	98	-	17
6949	46	3	38	-	5
6950	348	1	315	1	31
6951	330	48	269	1	12
6952	17	13	2	-	2
6954	1	-	-	-	1
6955	2	-	-	1	1
6956	6	-	5	-	1
6957	23	19	4	-	-
6958	7	3	4	-	-
6959	4	-	4	-	-
6960	6	3	3	-	-
6961	15	12	3	-	-
6962	8	5	3	-	-
6963	9	5	4	-	-
6964	8	3	5	-	-
6965	6	-	6	-	-
6966	30	28	2	-	-
6967	6	-	1	4	1
6968	288	41	246	-	1
6969	39	31	4	1	3
7028	16	7	8	1	-
7092	1	-	-	1	-
8016	7	1	5	-	1
8017	6	4	1	-	1
8018	9	7	1	-	1
8019	9	7	1	-	1
8020	3	1	1	-	1
8021	22	18	1	2	1
8022	8	5	2	-	1
8023	5	3	1	-	1
8024	25	-	1	23	1
8025	4	-	-	3	1
8026	1	-	-	-	1
8027	57	47	7	3	-
8028	41	37	1	3	-
8029	2	-	2	-	-
8030	4	-	4	-	-
8031	25	12	-	11	2
8032	1	-	-	-	1
8033	14	6	5	2	1
8034	12	9	1	1	1
8035	20	6	9	5	-
8036	8	6	1	-	1
8037	18	9	4	4	1
8038	16	10	4	1	1
8039	10	5	2	2	1
8164	10	7	1	1	1
8165	18	12	3	2	1
8166	11	7	3	-	1
8167	27	18	8	-	1
8168	21	15	5	-	1
8169	23	17	5	-	1
8170	17	15	-	1	1
8171	28	26	1	-	1
8172	13	7	5	-	1
8173	13	11	1	-	1
8174	21	18	1	1	1
8175	16	12	3	-	1
8176	19	16	2	-	1
8177	6	5	-	-	1
8178	35	33	1	-	1
8179	11	10	-	-	1
8180	14	10	3	-	1
8181	9	7	1	-	1
8182	10	5	-	4	1

Claim Number	Number of Samples: Total with Asbestos	Not a Grace product	Insufficient Data	Wrong Components	Not Inconsistent with Grace Formula
8183	11	10	-	-	1
8184	7	4	1	-	2
8185	59	48	7	3	1
8186	9	7	1	-	1
8357	2	-	2	-	-
8358	7	-	6	1	-
8359	8	-	7	1	-
8360	15	6	6	1	2
8361	5	-	3	2	-
8362	21	-	21	-	-
8363	9	4	5	-	-
8364	5	-	5	-	-
8365	15	1	11	3	-
8366	8	4	1	1	2
8367	5	-	4	-	1
8368	7	-	1	6	-
8369	7	-	7	-	-
8370	7	-	4	3	-
8371	12	-	12	-	-
8372	3	-	3	-	-
8373	4	-	4	-	-
8374	4	2	2	-	-
8375	12	-	12	-	-
8376	6	-	3	-	3
8377	3	-	2	-	1
9645	321	8	71	240	2
9646	108	3	98	6	1
9647	132	10	113	8	1
9684	14	3	10	1	-
9840	1	-	-	-	1
9841	1	-	-	-	1
9844	1	-	-	-	1
9845	2	-	-	-	2
9846	1	-	-	-	1
9847	1	-	-	-	1
9848	1	-	-	-	1
9850	1	-	-	-	1
9851	1	-	-	-	1
9852	1	-	-	-	1

Claim Number	Number of Samples: Total with Asbestos	Not a Grace product	Insufficient Data	Wrong Components	Not Inconsistent with Grace Formula
9853	1	-	-	-	1
9854	1	-	-	-	1
9855	2	-	-	-	2
9856	1	-	-	-	1
9858	1	-	-	-	1
9859	1	-	-	-	1
9860	1	-	-	-	1
9862	1	-	-	-	1
9863	1	-	-	-	1
9865	1	-	-	-	1
9866	1	-	-	-	1
9867	1	-	-	-	1
9869	1	-	-	-	1
9870	1	-	-	-	1
9871	2	-	-	-	2
9872	1	-	-	-	1
9873	1	-	-	-	1
9874	1	-	-	-	1
9875	1	-	-	-	1
9876	2	-	-	-	2
9877	1	-	-	-	1
9878	1	-	-	-	1
9879	1	-	-	-	1
9880	1	-	-	-	1
9882	1	-	-	-	1
9884	1	-	-	-	1
9885	1	-	-	-	1
9886	1	-	-	-	1
9887	1	-	-	-	1
9890	1	-	-	-	1
9891	2	-	-	-	2
9892	1	-	-	-	1
9893	1	-	-	-	1
9895	1	-	-	-	1
9896	1	-	-	-	1
9897	1	-	-	-	1
9909	1	-	-	-	1
9910	1	-	-	-	1
9912	5	-	-	-	5

Claim Number	Number of Samples: Total with Asbestos	Not a Grace product	Insufficient Data	Wrong Components	Not Inconsistent with Grace Formula
9913	5	-	-	-	5
10631	36	-	18	18	-
10632	56	-	37	19	-
10633	35	5	22	8	-
10634	45	-	24	21	-
10635	27	4	8	15	-
10636	32	2	20	10	-
10637	46	12	15	19	-
10638	44	12	22	10	-
10640	17	7	7	3	-
10641	115	6	45	64	-
10642	52	9	9	34	-
10643	54	12	38	4	-
10644	72	8	50	14	-
10645	34	7	10	17	-
10646	15	-	4	11	-
10647	59	12	28	19	-
10648	49	8	29	-	12
10649	12	-	4	7	1
10650	2	-	2	-	-
10651	14	-	14	-	-
10652	1	-	1	-	-
10653	22	-	18	4	-
10654	25	-	16	7	2
10655	6	2	4	-	-
10656	8	-	8	-	-
10657	1	-	1	-	-
10658	16	-	11	5	-
10659	4	3	1	-	-
10661	27	-	12	14	1
10662	7	-	1	6	-
11008	10	-	-	-	10
11285	37	-	34	-	3
11286	39	5	29	-	5
11287	80	47	28	4	1
11288	14	7	2	3	2
11289	8	4	2	-	2
11290	20	18	1	-	1
11291	10	3	5	-	2

Claim Number	Number of Samples: Total with Asbestos	Not a Grace product	Insufficient Data	Wrong Components	Not Inconsistent with Grace Formula
11292	35	28	3	3	1
11293	3	1	1	-	1
11294	18	10	6	-	2
11295	22	9	9	3	1
11296	17	16	-	-	1
11297	7	-	6	-	1
11322	22	16	6	-	-
11323	15	9	5	1	-
11326	24	3	9	10	2
11327	15	1	9	4	1
11328	22	-	9	11	2
11329	17	3	3	10	1
11330	5	-	3	-	2
11618	6	6	-	-	-
11620	4	1	2	1	-
11627	82	47	20	14	1
11632	1	-	-	-	1
11664	14	8	6	-	-
11678	10	7	3	-	-
11680	7	5	1	1	-
11681	15	7	8	-	-
11682	17	5	4	8	-
11683	4	-	3	1	-
11684	16	5	11	-	-
12293	48	41	7	-	-
12303	33	1	16	16	-
12304	7	-	5	2	-
12305	14	-	14	-	-
12307	10	-	10	-	-
12308	40	-	28	12	-
12310	34	2	32	-	-
12311	14	5	9	-	-
12312	12	2	1	9	-
12313	12	3	7	2	-
12315	2	1	-	1	-
12316	2	-	2	-	-
12317	1	1	-	-	-
12322	1	-	1	-	-
12329	28	12	16	-	-

Claim Number	Total with Asbestos	Not a Grace product	Insufficient Data	Wrong Components	Not Inconsistent with Grace Formula
	Number of Samples				
12331	24	13	11	-	-
12346	6	-	6	-	-
12348	62	57	5	-	-
12368	28	-	26	2	-
12377	22	16	5	-	1
12388	18	17	-	-	1
12394	20	15	4	-	1
12395	10	3	-	7	-
12396	7	6	1	-	-
12397	8	5	2	1	-
12405	10	3	1	6	-
12410	12	6	5	-	1
12412	26	17	8	-	1
12421	81	3	32	46	-
12422	86	25	61	-	-
12423	23	15	6	2	-
12424	17	7	10	-	-
12427	6	5	1	-	-
12430	54	18	35	1	-
12431	12	6	6	-	-
12432	17	12	5	-	-
12433	28	15	13	-	-
12438	80	62	17	-	1
12439	355	224	130	-	1
12440	265	157	108	-	-
12442	27	16	5	5	1
12443	354	248	104	2	-
12454	135	130	4	-	1
12457	18	13	4	-	1
12476	68	45	23	-	-
12489	4	-	4	-	-
12490	7	5	2	-	-
12491	22	12	10	-	-
12493	226	147	63	16	-
12496	4	2	1	-	1
12498	79	57	22	-	-
12500	100	83	17	-	-
12501	409	280	128	1	-
12503	65	46	19	-	-

Claim Number	Total with Asbestos	Not a Grace product	Insufficient Data	Wrong Components	Not Inconsistent with Grace Formula
	Number of Samples				
12522	3	2	-	1	-
12526	4	4	-	-	-
12527	3	3	-	-	-
12528	1	1	-	-	-
12530	11	2	9	-	-
12531	1	-	1	-	-
12533	6	3	3	-	-
12534	23	17	5	1	-
12536	41	17	22	2	-
12537	10	8	1	-	1
12541	9	8	-	-	1
12542	8	4	4	-	-
12546	27	23	3	-	1
12548	1	-	-	-	1
12549	23	21	1	-	1
12554	2	1	-	-	1
12557	27	19	7	-	1
12570	67	54	12	-	1
12576	2	1	-	-	1
12590	83	45	37	-	1
12591	120	72	45	2	1
12651	6	-	2	3	1
12652	21	15	5	-	1
12653	14	-	1	-	13
12654	2	2	-	-	-
12655	8	-	3	-	5
12656	14	7	4	-	3
12657	17	7	7	-	3
12658	27	11	11	-	5
12659	4	-	1	-	3
12660	24	8	7	4	5
12661	19	13	3	-	3
12662	13	6	-	-	7
12663	14	6	1	-	7
12664	7	6	-	-	1
12665	30	12	16	-	2
12666	26	12	12	1	1
12667	25	7	12	1	5
12669	34	21	8	-	5

Claim Number	Number of Samples				
	Total with Asbestos	Not a Grace product	Insufficient Data	Wrong Components	Not Inconsistent with Grace Formula
12672	30	28	2	-	-
12673	14	7	7	-	-
12674	7	2	2	-	3
12675	1	-	-	-	1
12676	1	-	-	-	1
12677	2	-	-	-	2
12678	1	-	-	-	1
12679	1	-	-	-	1
12680	1	-	-	-	1
12681	11	7	4	-	-
12682	16	15	1	-	-
12683	41	15	26	-	-
12684	476	429	20	26	1
12685	36	31	4	-	1
12686	4	-	3	-	1
12687	15	4	9	-	2
12688	4	-	-	-	4
12689	6	-	1	3	2
12690	2	-	-	1	1
12691	51	44	5	-	2
12692	164	75	62	26	1
12693	113	23	59	30	1
12694	98	21	47	27	3
12695	88	9	48	30	1
12696	78	36	17	22	3
12697	233	186	31	15	1
12698	234	186	30	16	2
12699	157	74	55	27	1
12701	14	3	10	-	1
12702	3	1	1	-	1
12711	2	1	-	-	1
12712	3	1	1	-	1
12713	2	1	-	-	1
12714	3	1	1	-	1
12715	2	1	-	-	1
12716	3	1	1	-	1
12717	5	2	2	-	1
12718	22	3	18	-	1
12719	5	1	2	-	2
12720	264	184	50	30	-
12721	8	-	-	5	3
12722	5	1	2	-	2
12723	5	1	2	-	2
12724	6	3	1	-	2
12725	4	1	2	-	1
12726	5	1	2	-	2
12727	9	1	6	-	2
12728	13	1	11	-	1
12729	3	1	1	-	1
12730	4	-	-	-	4
12731	4	-	-	-	4
12732	4	-	-	-	4
12733	4	-	-	-	4
12734	30	12	9	5	4
12735	4	-	-	-	4
12736	1	-	-	-	1
12737	25	19	3	1	2
12752	1	-	-	1	-
12758	1	-	-	-	1
12780	3	1	2	-	-
13950	8	2	2	4	-
14411	40	19	11	5	5
14885	21	4	16	-	1
14707	**7504**	**5147**	**1418**	**638**	